

SPECIFICATION AMENDMENTS

On page 1, above line 1, insert: --Priority Claim and Cross Reference

The present application is a 35 U.S.C. 371 national stage filing of PCT/EP2004/051614 filed 27 July 2004, which is a continuation-in-part of US 10/368/128 filed 18 February 2003, which claims benefit of US provisional application 60/358226 filed 20 February 2002. In addition, the present application claims priority of European patent application No. 03077606.6, filed 19 August 2003."

On page 1, above line 1, insert--Field of the Invention--

On page 1, above line 4, insert--Background of the Invention--

On page 3, above line 26, insert--Summary of the Invention--

The paragraph on line 26 of page 3 has been amended as follows: --

~~--It is thus an object of the~~ The invention ~~to~~ provides a system and a method for drilling a bore hole into an earth formation that allows for improved control of the fluid pressure in the well bore.--

The paragraph on line 30 of page 3, ending on line 21 of page 4, has been amended as follows:

--According to the invention, there is provided a drilling system for drilling a bore hole into an earth formation, the bore hole having an inside wall, and the system comprising:

- a drill string reaching into the bore hole leaving a drilling fluid return passage between the drill string and the bore hole inside wall;
- a drilling fluid discharge conduit in fluid communication with the drilling fluid return passage;
- pump means for pumping a drilling fluid through the drill string into the bore hole and to the drilling fluid discharge conduit via the drilling fluid return passage;
- back pressure means for controlling the drilling fluid back pressure; and

~~— fluid injection means comprising an injection fluid supply passage fluidly connecting an injection fluid supply to the drilling fluid return passage and further comprising an injection fluid pressure sensor arranged to provide a pressure signal in accordance with an injection fluid pressure in the injection fluid supply passage;~~

~~- back pressure control means for controlling the back pressure means whereby the back pressure control means is arranged to receive the pressure signal and to regulate the back pressure means in dependence of at least the pressure signal.--~~

Please insert the following new paragraphs on page 4 between lines 21 and 22:

--The ability to provide adjustable back pressure during the drilling process provides a significant improvement over conventional drilling systems, in particular in relation to UBD where the drilling fluid pressure must be maintained as low as possible in the operational window.

In general terms, the required back pressure to obtain the desired down hole pressure is determined by obtaining information on the existing down hole pressure, referred to as the bottom hole pressure, comparing the information with a desired down hole pressure and utilizing the differential between these for determining a set-point back pressure and controlling the back pressure means in order to establish a back pressure close to the set-point back pressure.

Accordingly, the drilling system may comprise means for obtaining information on the existing down hole pressure of the drilling fluid in the vicinity of the bottom hole assembly.

The back pressure control means may comprise a programmable pressure monitoring and control system arranged to receive the information on the existing down hole pressure, calculate a predicted down hole pressure using a model, compare the predicted down hole pressure to a desired down hole pressure, and to utilize the differential between the calculated and desired pressures to control said fluid back pressure means.

The pressure of an injection fluid in an injection fluid supply passage may be utilized for obtaining information relevant for determining the current bottom hole pressure.

Accordingly, the drilling system may comprise fluid injection means comprising an injection fluid supply passage fluidly connecting an injection fluid supply to the drilling fluid return passage and further comprising an injection fluid pressure sensor arranged to provide a pressure signal in accordance with an injection fluid pressure in the injection fluid supply passage.

There is also provided a drilling system for drilling a bore hole into an earth formation, the bore hole having an inside wall, and the system comprising:

- a drill string reaching into the bore hole leaving a drilling fluid return passage between the drill string and the bore hole inside wall;

- a drilling fluid discharge conduit in fluid communication with the drilling fluid return passage;

- pump means for pumping a drilling fluid through the drill string into the bore hole and to the drilling fluid discharge conduit via the drilling fluid return passage;

- a bottom hole assembly supported by the drill string, the bottom hole assembly comprising a down hole sensor and a down hole telemetry system for transmitting data, including down hole sensor data, the down hole sensor data at least representing down hole pressure data;

- back pressure means controlling the drilling fluid back pressure;

- back pressure control means controlling the back pressure means, wherein the back pressure control means comprises a programmable pressure monitoring and control system arranged to receive the down hole sensor data, calculate a predicted down hole pressure using a model, compare the predicted down hole pressure to a desired down hole pressure, and to utilize the differential between the calculated and desired pressures to control said fluid back pressure means, and wherein the programmable pressure monitoring and control system is arranged to compare the predicted down hole pressure with the down hole sensor data. --

The paragraph on line 22 of page 4, ending on line 9 of page 5 has been amended as follows:

- The invention also provides a drilling method for drilling a bore hole into an earth formation, the bore hole having an inside wall, the drilling method comprising the steps of:

-deploying a drill string into the bore hole and forming a drilling fluid return passage between the drill string and the bore hole inside wall;

-pumping a drilling fluid through the drill string into the bore hole and via the drilling fluid return passage to a drilling fluid discharge conduit arranged in fluid communication with the drilling fluid return passage; and

-controlling a drilling fluid back pressure by controlling back pressure means[[:]]

~~————— injecting an injection fluid from an injection fluid supply via an injection fluid supply passage into the drilling fluid in the drilling fluid return passage;~~

~~————— generating a pressure signal in accordance with an injection fluid pressure in the injection fluid supply passage;~~

~~————— controlling the back pressure means, which controlling comprises regulating the back pressure means in dependence of at least the pressure signal.--~~

Please insert the following new paragraphs on page 5 between lines 9 and 10:

--Accordingly, the method may include obtaining information on the existing down hole pressure and comparing the information with a desired down hole pressure and utilizing the differential between these for determining a set-point back pressure and controlling the back pressure means in order to establish a back pressure close to the set-point back pressure.

The information of the existing down hole pressure may be fed into a model and a predicted down hole pressure may be calculated using the model. The predicted down hole pressure may be compared to a desired down hole pressure.

Obtaining information on the existing down hole pressure of the drilling fluid in the vicinity of the bottom hole assembly may comprise:

-injecting an injection fluid from an injection fluid supply via an injection fluid supply passage into the drilling fluid in the drilling fluid return passage;

-generating a pressure signal in accordance with an injection fluid pressure in the injection fluid supply passage.--

On page 8, above line 12, insert--Brief Description of the Drawings--

Please replace the paragraph on page 8 starting on line 12 and ending on line 28 with the following paragraph: --

The invention will now be illustrated by way of example, with reference to the accompanying drawing wherein

Fig. 1 is a schematic view of a drilling apparatus according to an embodiment of the invention;

Fig. 2 schematically shows a schematic well configuration in a drilling system in accordance with an embodiment of the invention;

Fig. 3 is a block diagram of the pressure monitoring and control system utilized in an embodiment of the invention;

Fig. 4 is a functional diagram of the operation of the pressure monitoring and control system;

Fig. 5 is a schematic view of a drilling apparatus according to another embodiment of the invention;

Fig. 6 is a schematic view of a drilling apparatus according to yet another embodiment of the invention. --

On page 8, above line 31, insert--Detailed Description of the Invention--

On page 23, after line 19, insert the following paragraph:

--While the illustrative embodiments of the invention have been described with particularity, it will be understood that various other modifications will be readily apparent to, and can be easily made by one skilled in the art without departing from the spirit of the invention. Accordingly, it is not intended that the scope of the following claims be limited to the examples and descriptions set forth herein but rather that the claims be construed as encompassing all features which would be treated as equivalents thereof by those skilled in the art to which this invention pertains.--

On page 24, above line 1, insert:--We claim:--